

REMARKS

Claims 1 through 20 were presented for examination. In addition to objections as to the specification, the Examiner rejected claims 1 through 20, in a non-final office action dated March 25, 2004, as being anticipated and/or obvious in light of the cited prior art. Applicants have amended the application to overcome the Examiner's objections to the specification. In order to clarify the invention, applicants have also amended some of the claims. Additionally, applicants present arguments, herein, in support of the allowance of the presently claimed invention.

Objections to the Specification

The Examiner objected to the specification as representing a series of claims 1-86 in paragraph [0019] spanning the filed specification from pages 5 through 17. The Examiner noted the specification to conclude with claims 1-20 in accordance with 37 CFR § 1.75. Applicants have cancelled paragraph [0019] in the present amendment thereby overcoming the objection and leaving claims 1-20 present for examination.

The Examiner further objected to the omission of the patent application/issued patent number on pages 1 and 26 of the specification. Applicants have amended paragraphs [0001] and [0038] to remedy these omissions.

The Examiner further objected to minor informalities in the Abstract and on pages 19 and 23. Applicants have amended paragraphs [0021] and [0031] and the **Abstract** to overcome these objections. Applicants have further amended the specification at paragraphs [0028], [0044] and [0049] to correct additional informalities not noted by the Examiner.

No new matter is added by these amendments and the Applicants contend the Examiner's objections to the specification are fully overcome.

Claim Rejections—35 U.S.C. § 102

The Examiner rejected claims 1-13, 15-18 and 20 as being anticipated by U.S. Patent Number RE35,148 to *Lizzi et al.* (hereinafter *Lizzi*). Applicants respectfully traverse.

Claims 1 and 18

On page 3 of the office action, the Examiner contends, with respect to claims 1, 7 and 18, that *Lizzi* teaches:

transmitting ultrasound (14, 16), receiving the tissue-modified echo pulses and generating an electrical signal therefrom in transducer 14, with output on 18, then parallel-processing the signal in narrowband imaging modes (Figs. 3 and 5-7) and generating position-organized echo image frame data responsive to output of 38, 68, 146 or 176 and to (clocked) positional information as shown at the bottom of these figures.

Applicants have amended claim 1 to include an additional element of **“generating image data using the positional data wherein the image data has no visible temporal anomalies.”** The Examiner suggests *Lizzi* discloses the limitation of claim 5 (this limitation being similar to the newly included element of claim 1) at col. 5, lines 44-47. Applicants respectfully traverse as the portion of *Lizzi* noted by the Examiner pertains to gain amplification and signal strength, not generation of image data. *Lizzi*, at best, teaches generation of a signal with **decreased speckle content** (col. 6, l. 11), which is not the same as temporally synchronized data, that is, the claimed **“image data [with] no visible temporal anomalies.”**

As *Lizzi* fails to teach generating image data with no visible temporal anomalies, *Lizzi* cannot be said to disclose each and every element of the claimed invention. See *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 U.S.P.Q. 481, 485 (Fed.Cir. 1984). The Examiner’s 35 U.S.C. § 102 rejection as to claim 1, therefore, is overcome.

Claim 1 also recites, in part, “a single set of ultrasound pulse firings” transmitted into a media of interest; a transducer then receives the modified pulse firing (e.g., Doppler and harmonic images). This single set of firings allows for the generation of image data with no visible temporal anomalies, that is, the image is visibly temporally synchronized.

In contrast, *Lizzi* is concerned with basic multi-band frequency compounding to reduce speckle and coherent summing of multi-band signals to obtain broader overall bandwidth/resolution. *Lizzi* fails, however, to overcome the larger problem of multiple series of ultrasound firings, generated at different times, inherently resulting in temporal anomalies. These multiple sets of data are then combined for simultaneous display thereby causing the displayed image to contain undesirable anomalies regardless of any improvement in resolution.

A closer reading of *Lizzi* further reveals that *Lizzi* does not necessarily teach “parallel-processing” as claimed in the present invention. While Figures 3 and 5-7 of *Lizzi*, as referred to by the Examiner, reflect a plurality of band-pass filters, there is **no indication** that this filtering occurs **in parallel** as is presently claimed in, for example claim 1: “**parallel processing** the signals using a plurality of imaging modes.”

Furthermore, claim 1 of the present invention recites, “parallel processing the signals using a plurality of **imaging modes**.” In contrast, *Lizzi* is limited to **band-pass filtering**. Col. 5, l. 12. The present application’s claimed “plurality of **imaging modes**” is not the equivalent of *Lizzi*’s **band-pass filtering**. In support of this argument, Applicants direct the Examiner’s attention to paragraph [0022] on page 19 of the filed specification. Applicants’ invention discloses, “**filter 142 includ[ing]** a multi-channel **band-pass filter** that selectively impedes specific frequency ranges.” Claim 1 of the application, however, recites **imaging modes**—not

the **band-pass filter** as taught by *Lizzi*. While the present invention can undertake band-pass filtering—as evidenced in **filter 142**—the *claimed* invention does not require this limitation. The present invention claims the aforementioned **imaging modes** (*e.g.*, Doppler or harmonic).

The Examiner’s rejections as to claim 1 also served as the basis for rejection of claim 18. Claim 18 represents a system for practicing the method of claim 1, including the same limitations, and is, therefore, allowable for at least the same reasons as claim 1.

Claim 3

On page 3 of the office action, the Examiner, with regard to *Lizzi*, contends claim 3 to be anticipated, *inter alia*, in that “Figs. 5 and 7 are directed to digital conversion within the channels (Fig. 5) or prior to separation into the pre-processor channels (Fig 7).”

A closer reading of *Lizzi* reveals that *Lizzi* does not necessarily teach “frequency band preprocessors” as recited in claim 3 of the present invention. *Lizzi*, as noted in the context of claim 1, reveals that it is limited to **band-pass filtering**. The claimed “plurality of **frequency band preprocessors**” is not the equivalent of *Lizzi*’s **band-pass filtering**.

In support of this argument, Applicants direct the Examiner’s attention to paragraph [0023] on page 19 of the filed specification. Applicants’ invention discloses “**preprocessing module 160** includ[ing] a plurality of **frequency band preprocessors 162A-Z**” which are “optionally differentiated by one or more characteristics.” These preprocessors “take selected data and process it in parallel such that all of the data passed by **band-pass filter 142** is optionally processed by at least one frequency band preprocessor 162A-Z.” A **band-pass filter**—as taught by *Lizzi*—is a separate and unclaimed component of applicants’ invention and

is not the equivalent of a **frequency band preprocessor**. Thus, *Lizzi* fails to teach the preprocessors of claim 3 and the Examiner's 35 U.S.C. § 102 rejection, as in claim 1, is overcome.

Claim 5

The limitations of claim 5 have largely been incorporated into claim 1 therefore making claim 5 redundant. Applicants have, therefore, cancelled claim 5.

Claims 2, 4, 6-13, 15-17, 20

Claim 2 is dependent upon independent claim 1 as discussed above. Claims 4 and 6-13 and 15-17 are either directly or indirectly dependent upon claim 3 as discussed above. Claim 20 is dependent upon independent claim 18 as discussed above. Each and every one of these claims reflect a further limitation of claims 1, 3 and/or 18 and are allowable for at least the same reasons as independent base claims 1, 3 and 18.

Claim Rejections—35 U.S.C. § 103

The Examiner rejected claims 14, 15 and 19 as being obvious in light of *Lizzi* in view of U.S. Patent Number 5,908,389 to *Roundhill et al.* (hereinafter *Roundhill*), U.S. Patent Number 6,514,206 to *Maxwell et al.* (hereinafter *Maxwell*), and U.S. Patent Number 6,695,783 to *Henderson et al.* (hereinafter *Henderson*), respectively. Applicants respectfully traverse.

All of the Examiner's 35 U.S.C. § 103 rejections depend upon, in part, *Lizzi*. As has been established in the discussion of the Examiner's 35 U.S.C. § 102 rejections, *Lizzi* fails to teach each and every element of independent claims 1, 3 and 17. Dependent claims 14, 15 and 19—all

being dependent upon on of the aforementioned independent base claims—therefore lack the base elements of these underlying independent claims. Even should *Maxwell, Henderson* or *Roundhill* exhibit the features as claimed by the Examiner, such disclosure does not overcome the absent elements of *Lizzi* in the presently claimed invention. Therefore, the Examiner's 35 U.S.C. § 103 rejections are overcome.

CONCLUSION


Applicants respectfully contend the Examiner's objections as to the specification and rejections as they pertain to claims 1-20 have been fully overcome and that the application is now in condition for allowance.

Applicants invite the Examiner to contact their undersigned representative with any questions concerning the present amendment or the application, in general, as set forth below.

Respectfully submitted,
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